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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/605,926

11/06/2003

Xiaomeng Chen

BUR920030123US2

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06/27/2005

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EXAMINER

NGUYEN, THANH T

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 06/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/605,926

Applicant(s)

CHEN ET AL.

Examiner

Thanh T. Nguyen

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 April 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30, 34 and 35 is/are pending in the application.
- 4a) Of the above claim(s) 5-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 34-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 4/7/05 have been fully considered but they are not persuasive.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 34-35 are rejected under 35 U.S.C. 102(b) as being anticipated by Daniels et al. (U.S. Patent No. 6,583,047).

Regarding to claim 1, Referring to figures 4a-4h, Daniels et al. teaches a method for reducing resist poisoning, comprising the steps of;

forming a first structure (opening portion, see figure 4b-4c) in a dielectric (low-k) on a substrate;

reducing amine related contaminants from the dielectric and the substrate created after the formation of the first structure (see figure 4d, col. 16, lines 33-40, 52-58, Daniels et al.

teaches reducing amine related contamination from the dielectric by using plasma N₂O); and

forming a second structure in the dielectric (see figure 4f).

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Regarding to claim 2, wherein the reducing step includes providing an N₂O plasma wafer treatment to the dielectric and substrate (col. 16, lines 52-58).

Regarding to claim 34, reducing step includes using a plasma wafer treatment to tie up contaminants in the substrate thereby preventing the contaminants from diffusing out from the substrate to a resist layer in subsequently etching processes (see col. 16, lines 33-58). Noted that the N₂O plasma treatment reacted with the contaminant to form the protective layer, therefore, prevent the contaminants from diffusing out from the substrate to a resist layer.

Regarding to claim 35, forming the second structure (see figure 4f) on the substrate is substantially devoid of amine related contaminant (see col. 16, lines 42-50, figures 4e-4f).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daniels et al. (U.S. Patent No. 6,583,047) as applied to claims 1-2 above in view of an ordinary skill in the art.

Daniels et al. teaches a method of providing an N₂O plasma wafer treatment to the dielectric and substrate to reduce amine related contaminants. However, the reference does not teaches the N₂O plasma treatment chemically binds, traps or consume the contaminant such that the contaminants will not diffuse out from either the substrate or the dielectric during the

formation of the second structure, and the specific temperature of wafer treatment.

Regarding to claim 4, wherein the N₂O plasma treatment chemically binds, traps or consumes the contaminants such that the contaminants will not diffuse out from either the substrate or the dielectric during the formation of the second structure (see col. 16, lines 52-58).

Therefore, it would have been obvious to a person of ordinary skill in the requisite art at the time of the invention was made would treat the dielectric layer by using the N₂O plasma treatment chemically binds, traps or consumes the contaminants such that the contaminants will not diffuse out from either the substrate or the dielectric during the formation of the second structure in process of Daniel et al. because N₂O plasma treatment will oxidize and to form the protect layer to protect the wall/floor or the vias/trench or the dielectric layer.

Regarding to claim 3, it would have been obvious to a person of ordinary skill in the requisite art at the time of the invention was made to optimize the temperature treatment, since it has been held that where the general conditions of a claim are disclosed in the prior art (i.e.- plasma treatment performed at approximately 400 degrees Celsius), discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233 (CCPA 1955).

The specification contains no disclosure of either the critical nature of the claimed arrangement (i.e.- wherein the plasma treatment performed at approximately 400 degrees Celsius) or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen limitations or upon another variable recited in a claim, the applicant must show that the chosen limitations are critical. In re Woodruff, 919 F.2d 1575, 1578 (FED. Cir. 1990).

Therefore, it would have been obvious to a person of ordinary skill in the requisite art at the time of the invention was made would plasma treat at any temperature in process of Daniels et al. because choosing the optimum ranges involves only routine skill in the art.

Response to Arguments

Applicant's arguments filed 4/7/05 have been fully considered but they are not persuasive.

Applicant contends that Daniels does not teach reducing amine related contaminants from diffusing out from the dielectric layer and the substrate prior to a formation of the second structure on the substrate. In response to applicant that Daniels does not teach reducing amine related contaminants from diffusing out from the dielectric layer and the substrate prior to a formation of the second structure on the substrate (see col. 16, lines 30+). Noted that the protective layer formed from the N₂O plasma treatment. Therefore, it is inherent that the protective layer will prevent/reducing contaminants from diffusing out from the dielectric or the substrate prior to a formation of the second structure on substrate.

Applicant contends that Daniels does not teach plasma treatment on the substrate. In response to applicant that Daniels clearly teaches plasma treatment on the substrate (see figure 4d and 8d, col. 16, lines 33-47). It is also noted that on doesn't mean that directly on and in contact with the substrate.

Applicant contends that Daniels does not teach at the temperature of 400 degrees Celsius to enhance the properties of the amine reducing layer formed on the structure.

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In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the temperature of 400 degrees Celsius to enhance the properties of the amine reducing layer formed on the structure) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh Nguyen whose telephone number is (571) 272-1695, or by Email via address Thanh.Nguyen@uspto.gov. The examiner can normally be reached on Monday-Thursday from 6:00AM to 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr., can be reached on (571) 272-1702. The fax phone number for this Group is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956 (See **MPEP 203.08**).



Thanh Nguyen
Patent Examiner
Patent Examining Group 2800

TTN